"If war were declared to-morrow, what would we do for aircraft?"

AVIATION

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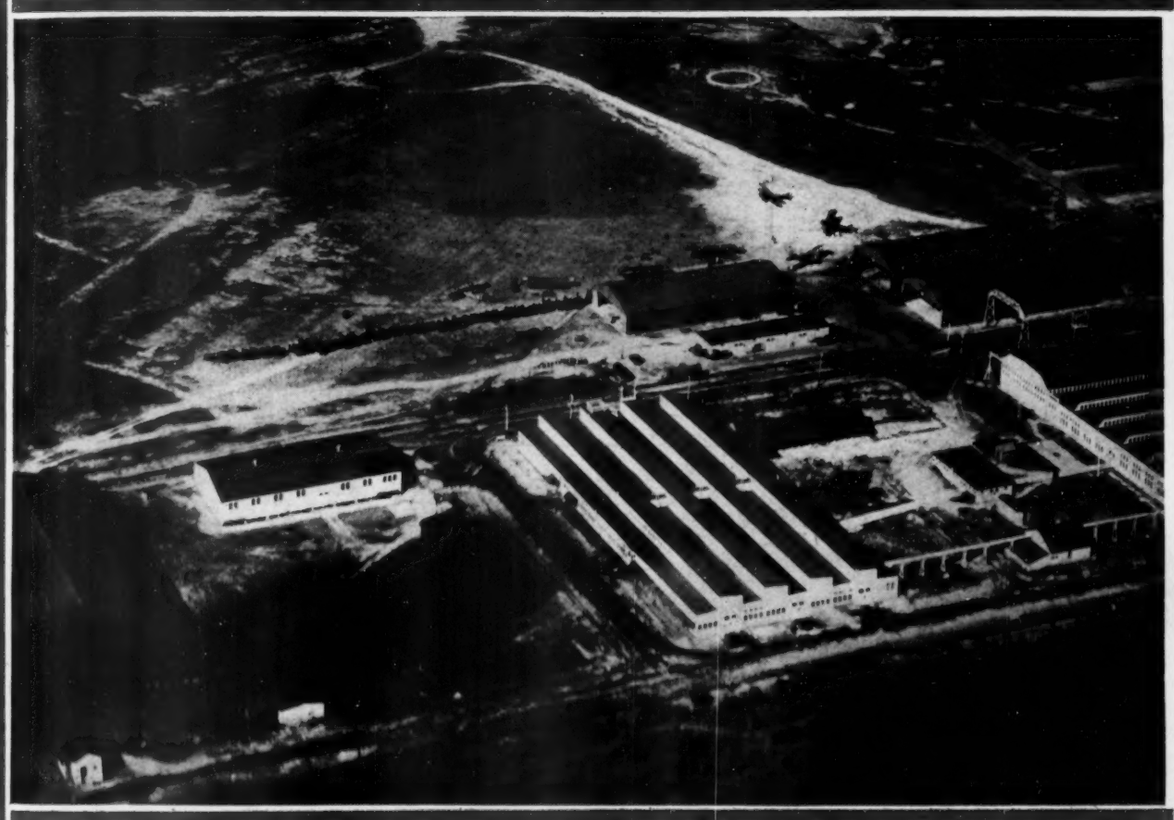

Maxwell Field, Montgomery (Ala.) Air Intermediate Depot

VOLUME XIV

Number 17

SPECIAL FEATURES

THE DORNIER "WAL" FLYING BOAT

N.A.A. STARTS MEMBERSHIP CAMPAIGN

LIEUT. L. J. MAITLAND MAKES NEW SPEED RECORD

LIGHTNING PROTECTOR FOR BALLOONS AND AIRSHIPS

THE GARDNER, MOFFAT CO., INC.

HIGHLAND, N. Y.

225 FOURTH AVENUE, NEW YORK

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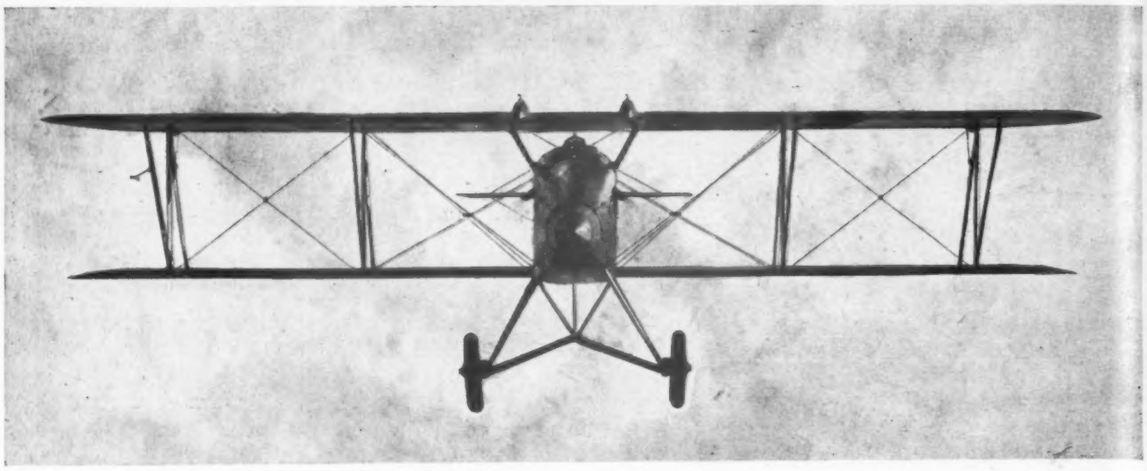
Curtiss



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APRIL 23, 1923

AVIATION

VOL. XIV. NO. 17

Member of the Audit Bureau of Circulations

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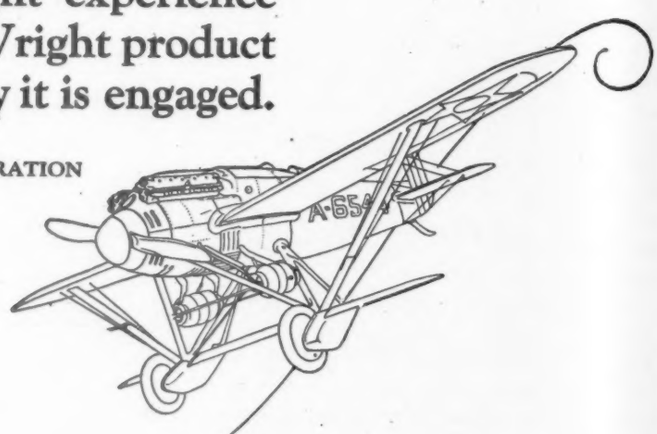

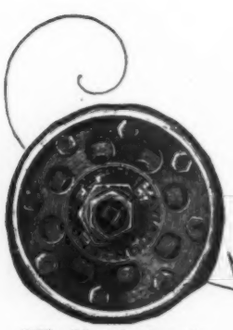

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AVIATION

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Vol. XIV APRIL 23, 1923 No. 17

The Dayton Wright Company

ANNOUNCEMENT has been made that the Dayton Wright Company will discontinue all aircraft work about July first. The retirement of this company from the aeronautical field is more important than would appear on the surface. Two facts are uppermost.

One is that it indicates that the General Motors Corporation with which the Dayton Wright Company is allied has decided that under existing conditions they do not consider aircraft work a field that is inviting. This in itself might be due to special conditions, but it is generally known that the large interests associated with these companies have become disgusted with the present plan of government purchasing of aircraft and they quit rather than go on and become Chinese copyists of any product that is developed in the industry. These companies know how the government buys automobiles. If it wants Cadillacs or Dodges it buys them from these companies at the current prices. It does not give out specifications of these cars and ask for bids from other automobile manufacturers.

The Dayton Wright Company has developed a training plane that is considered to embody some of the most remarkable qualities of any ship of this type. The firm has maintained a high class engineering department and it has been willing to invest money in the prospect of securing adequate orders. These have been inadequate to interest the company to continue in aircraft work.

The other fact that must be faced by the aircraft industry is that financial support will not become available for aircraft work until there is some practical demonstration in this country of commercial transport other than short haul passenger carrying. Ever since the war various schemes have been put forward for commercial air services and much loose talk has been indulged in. What is needed is an extensive demonstration of public air transport operating on schedule, with periodical announcements of results accomplished.

The Dayton Wright Co. did not want to continue to do business with the so-called "one customer", the government. The "one customer" idea was long ago shown to be an error. An aircraft manufacturer has not only to "sell" one purchasing officer, but he has to interest, sell and maintain his prestige with thousands of officers and enlisted men of the Army and Navy, those concerned with aviation in other departments, and then help in every way possible to impress on Congress the necessity for funds for this branch of our national defenses. A business where the profits have been shown to be precarious and where the number of people that must be kept interested is so large will not attract capital, for it will naturally seek less difficult fields of investment.

From the personal standpoint the leavetaking will be regretted by all in the industry. The personnel of the Dayton Wright Company has been of the type that cooperates and joins in all efforts to upbuild the industry. They will be greatly missed.

Four Miles a Minute

FOUR miles a minute, the rate of speed at which Lieut. L. J. Maitland traveled through the air when he established a new world's maximum speed record at Wilbur Wright Field, on March 29, is a speed difficult to visualize for those who have not witnessed some of the high speed flying done since the last Pulitzer Trophy race. Attentive observers at that great event were agreed that there was a marked difference between the airplanes which turned the laps around 200 m.p.h. and those which were some twenty miles slower. For some unaccountable reason there was no mistaking these two speeds: at 180 m.p.h. an airplane still gave the impression that it was flying; but at 200 m.p.h. there was something projectile-like in the appearance of these ships which clearly distinguished them from the rest, even from a certain distance. That the addition of 40 miles to the speed of such ships still further enhances the impression that they have been shot out of a monster gun, is evident.

In view of the extraordinary increase in speed which has been obtained in the last six months without requiring any kind of alteration of the Army Curtiss racer, it seems likely that much higher speeds will be attained at the forthcoming Pulitzer Trophy Race where machines embodying the latest experience in racing design will compete against one another. It would be idle to speculate what maximum speed may reasonably be expected, for in a race the final result depends on the sum of several equations, personal, mechanical, atmospheric, etc. which it is humanly impossible to foresee.

The outstanding fact is that racing airplanes are headed in the general direction of a five-miles-a-minute pace, and this despite the fact that only a few years ago an estimable scientist furnished mathematical proof that no airplane would ever exceed a speed of 200 m.p.h. *A priori*, there does not seem to be any theoretical limit to the speed of airplanes. It is merely a question of connecting the biggest engine with the smallest wings through the agency of a perfect streamline fuselage, which implies a retractable landing gear. The practical difficulty arises, however, from the question of safe landing speed. As the high speed goes up, so does the landing speed. To keep the latter down to a safe figure is perhaps the greatest problem in racing airplane design.

"If war were declared to-morrow what would we do for aircraft?"

Membership Campaign of the N.A.A.

National Aeronautic Association Starts An "America First in the Air" Campaign

The National Aeronautic Association of U.S.A. which was created last October, at Detroit, for the purpose of nationalizing American air activities and of bringing the country to the realization of the importance of air power for national defense purposes and commercial relations, is about to start on an extensive membership campaign. For this purpose the Association has organized complete field staffs in the nine districts into which the continental United States is divided for the purposes of the N.A.A., and which are coextensive with the nine Army Corps areas. These staffs will start the membership campaign on May 14, with the goal set at 50 000 members, to be reached by June 1.

The campaign organization in each district is in charge of a chairman, whose prominence is representative of the character of both the association and of its membership. There will be chairmen for every State and subdivisions of each State, so that all communities will be canvassed to enroll those citizens who realize that if this country is to hold its own in the realm of aerial travel and transport it has got to do it itself through the influence exerted by a cohesive body of public-spirited men and women.

Those Endorsing the Campaign

Active in the association and endorsing the membership campaign are the Hon. Melvin M. Johnson, Boston; Prof. E. P. Warner, Massachusetts Institute of Technology, Cambridge; Godfrey L. Cabot, President Aero Club of New England, Boston; Hon. James Hartness, ex-Governor of Vermont; Col. Edgar S. Gorrell, President Boston Marmon Co., Boston; Richard F. Hoyt, of Hayden, Stone & Co., New York; John D. Larkin, Jr., general manager Larkin Co., Buffalo, N. Y.; Maj. Loring C. Pickering, North American Newspaper Alliance, New York; Otto Praeger, former second assistant Postmaster General, New York; Arthur Woods, former Police Commissioner, New York; Col. B. F. Castle, Irving National Bank, New York; Dr. Joseph Ames, Baltimore, Md.; Rear Admiral W. F. Fullam, U.S.N., retired, Washington; W. F. Roberts, Bethlehem Steel Co., Sparrows Point, Md.; J. S. Steinmetz, Aero Club of Pennsylvania, Philadelphia; B. H. Mulvihill, president National Gas Conservation Co., Pittsburgh; W. T. Anderson, editor *Telegraph*, Macon, Ga.; Maj. James Meissner, Birmingham, Ala.; Charles A. Moffett, president Gulf States Steel Co., Birmingham, Ala.; Alfred W. Harris, Cleveland, Ohio; C. F. Kettering, chairman Ohio Aviation Commission, Dayton; Orville Wright, inventor of airplane, Dayton, Ohio; Glenn L. Martin, president Glenn L. Martin Co., Cleveland; B. M. Outcalt, Cincinnati; Frederick Patterson, National Cash Register Co., Dayton, Ohio; Howard E. Coffin, vice-president Hudson Motor Car Co., Detroit; Bion J. Arnold, chairman Chicago Air Board, Chicago, Ill.; C. Goodloe Edgar, chairman Aviation Committee, Board of Commerce, Detroit; Samuel M. Felton, President Chicago and Great Western Railway Co., Chicago; W. P. MacCracken, chairman Aviation Committee, American Bar Association, Chicago; Sidney D. Waldon, consulting automotive engineer, Detroit; Ralph W. Cram, editor, *Democrat and Leader*, Davenport, Iowa; Joseph Pulitzer, president Pulitzer Publishing Co., St. Louis; H. H. Bullen, American Steel & Wire Co., Denver; Dr. Frederick Terrell, banker, San Antonio, Tex.; Edgar C. Tobin, member of Lafayette Esquadrille during the war, San Antonio, Tex.; Hon. Ben W. Olcott, former governor of Oregon; Cecil B. DeMille, director-general, Famous Players-Lasky Corp., Los Angeles, Calif.; Lieut. Col. W. Jefferson Davis, Los Angeles, Calif.; P. G. Johnson, president Boeing Aircraft Corp., Seattle, Wash.; Sydney S. Bibbero, Banker, San Francisco, and many others.

President Coffin of the N.A.A. also has received strong endorsement of the aims and purposes of the association in the acceptance of appointment as governors-at-large by Major Gen. Leonard Wood, governor general of the Philippines; Hon. Newton D. Baker, former Secretary of War; Gould Dietz, Omaha, Neb.; Judge William P. MacCracken, Chicago, and William F. Roberts, general manager of the Maryland plant of the Bethlehem Steel Co.

National Headquarters

National headquarters, established at 26 Jackson Place, Washington, with a selected staff of workers, is in control of policies, information and finances. Each of the nine districts will have its own headquarters with a district manager and staff in direct contact with the general public through association chapters, flying clubs, air boards and civic associations. The basic strength of the association will be in its chapter units, chartered by the national body.

The association is pledged to encourage the up-building of the aeronautic industry as an important factor in the country's economic life; to enlighten the public on the needs and operation of aircraft in business; to use its influence for the creation of a Federal agency that will control and regulate civil aeronautics; to establish airways and landing fields, and uniformity of routes, rules and customs affecting air navigation; to arrange for and assist in exhibits, contests and aerial expositions, and to cooperate with all branches of the Government in furthering the use of aircraft for the convenience and benefit of the people in peace and for national defense in time of emergency.

Regarding the Wainwright Report

The membership campaign will stress the slogan of the association, "America First in the Air." In this connection it is interesting to record the views of W. Frank Roberts, general manager of the Bethlehem Steel Co.'s Maryland plant, on our unsatisfactory aerial situation. Mr. Roberts is of the opinion that by emphasizing, in his recent report, the industrial mobilization necessary in time of national emergency, the retiring assistant Secretary of War, J. Mayhew Wainwright, performed a valuable public service.

"What Mr. Wainwright emphasizes concerning the critical situation in our air service," said Mr. Roberts, "confirms the detailed reports submitted at hearings on appropriations by the chiefs of the air activities of the Army and Navy. Our existence aerially during the last four years has been due to war momentum, which is now practically spent. It is time to look the situation over from today's aspect of things. If I recall the facts correctly, General Patrick told Congress that the Army will have about 650 airplanes in service a year hence at the present rate of expenditure, and that only about 200 of these machines will be modern equipment.

"There are now some 1,990 airplanes listed as Army equipment, I am informed; but most of these are old war types and little can be expected of their operation than a continuation of the hazard which now exists in the use of these planes. The Britsh air ministry, according to recent statements credits the United States with 537 up-to-date aircraft in our Army and Navy, and estimates that France has 2520 planes in military service and 508 operating commercially. I believe that our aerial strength in modern planes is little more than one-tenth that of France. The estimate for the upkeep of the British air forces for the year 1923-24 is about $90,420,300, which indicates that England doesn't intend to occupy any but first place in the air. In fact the so-called French "air-menace" is showing a rapid rise in British temper.

"If war were declared to-morrow what would we do for aircraft?"

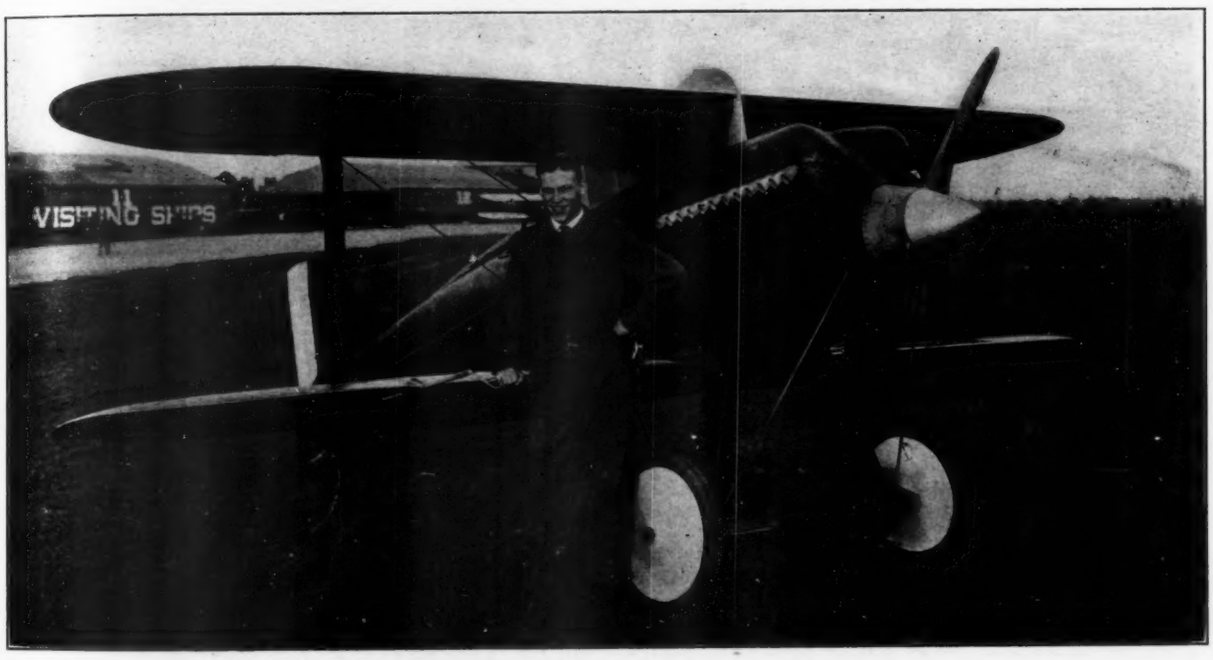
"Every American business man practices preparedness every day if he is a going concern," Mr. Roberts pointed out. "It seems to me that business men should be genuinely concerned that preparedness be practiced nationally if the country is to continue a going concern. Your National Aeronautic Association is in a strategic position to arouse Americans engaged in industry, finance, agriculture and commerce to their duty of moving Congress to recognize the facts of aviation. I am gratified to know that the association will embark upon a country-wide campaign for membership and that it is doing a fine patriotic work in enlightening the people as to our aeronautic situation.

"While I hardly go so far as to think our aircraft industry will disappear 'unless the Governemnt places with aircraft manufacturers sufficient orders to enable them to continue in operation,' as Mr. Wainwright states, nevertheless the industry certainly cannot exist in health upon the stimulation of dwindling homeopathic doses of orders for aircraft. The industry will waste away if it must await the building up of great aerial transportation systems. These are bound to come eventually and probably in a fraction of the time we required to develop our surface systems. In the extension of the railroads demand for equipment increased enormously, and our American industries met the demand as the network of lines covered the continent. In aviation that situation is reversed, as I see it, and it is due to Government hesitancy in encouraging this new and speedy means of transportaion.

"Our aeronautic industry has proved up if the records for speed, endurance, distance and altitude mean anything. It can supply the best equipment known, yet the industry is languishing for lack of reasonable stimulation, which the Government alone can supply through orders for aircraft. This is a dangerous situation. We know it is because we learned our costly lesson of emergency preparedness in 1917. Surely no sensible American wants to go through that feverish experience again; nor would he wish it upon his children."

Lieut. L. J. Maitland Makes New World Speed Record

Covers 1-kilometer Course at the Rate of 239.95 m.p.h.



Lieut. L. J. Maitland, A.S., the new world's maximum speed recordman standing beside the Army-Curtiss racer on which he made the record

The Contest Committee of the National Aeronautic Association of U.S.A. announced April 12 that it has homologated as a record the performance made by Lieut. L. J. Maitland, A.S., March 29, when he covered a 1-kilometer course at Wilbur Wright Field at an average speed of 239.95 m.p.h. (386.17 km.p.h.). Lieutenant Maitland's record thus beats the previous world's record of 233.01 m.p.h. made by Sadi Lecointe, by more than six miles. The American pilot reached his highest speed on the second dash, making the first two laps at 388.34 km.p.h. and the second two laps at 384 km.p.h. giving an average of 386.17 km.p.h.

Lieutenant Maitland's record, which was made with the Army Curtiss racer on which Brig. Gen. William Mitchell established a previous world's speed record of 222.97 m.p.h. on Oct. 18, 1922, will be the last maximum speed record established over a 1-kilometer course. From April 1 on the F.A.I. rules provide that such records be made over a 3-kilometer course.

It was stated in our issue of April 9 that inasmuch as Lieutenant Maitland apparently dove into the course on making the speed trials, it did not seem likely that his performance could be homologated as a record. Now, it appears that diving preparatory to flying the speed course is quite a common practice, as the F.A.I. rules contain no provision prohibiting it, the only restriction being that the 500 meters preceding the kilometer course be covered in horizontal flight. Hence the performance made by Lieutenant Maitland fully counts as a world's maximum speed record.

"If war were declared to-morrow what would we do for aircraft?"

The Dornier "Wal" Twin-Engined Flying Boat

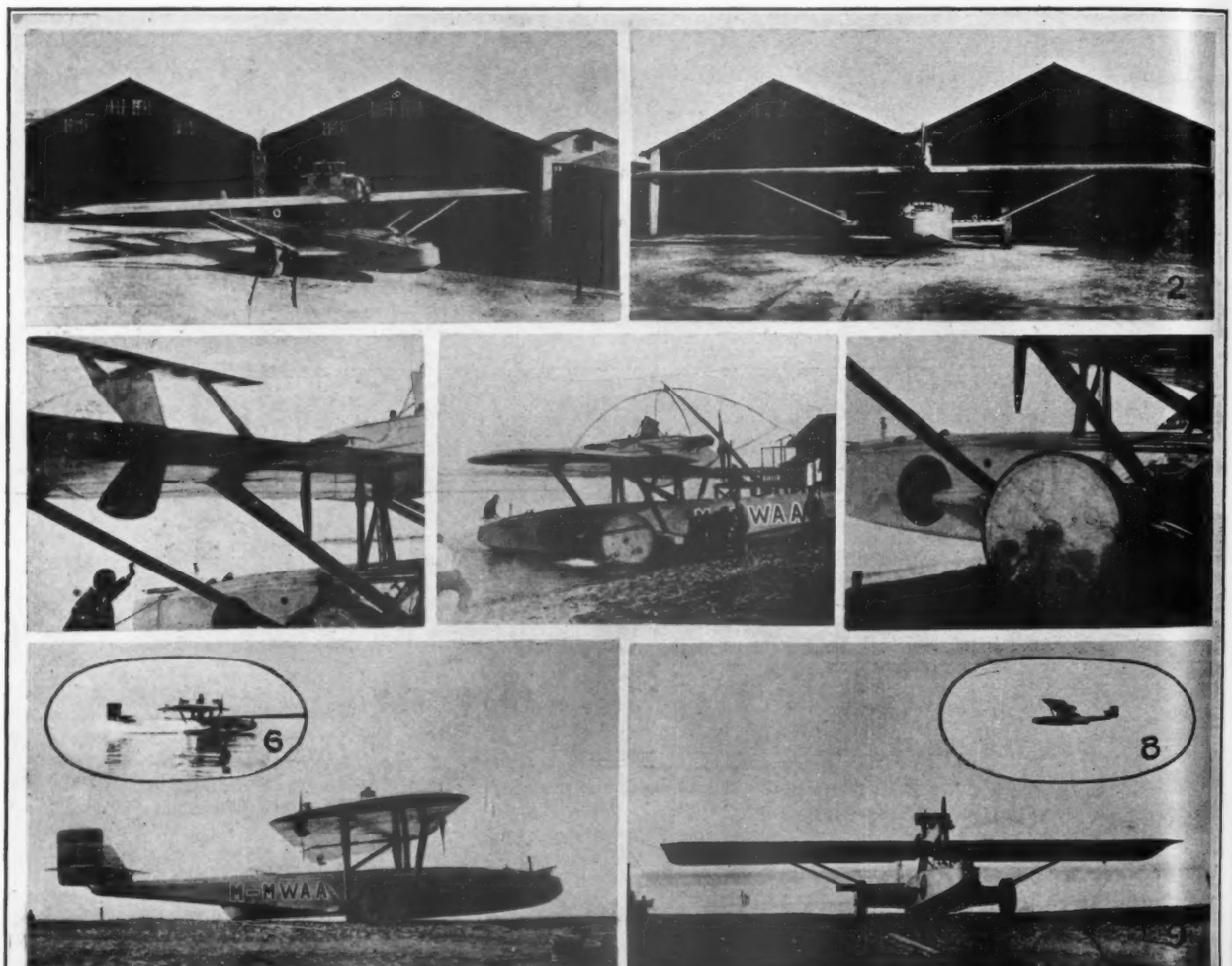
All-Metal Seaplane for Long-Range Scouting And Bombardment Work Has Powerful Armament

In designing this type the Dornier Metallbauten of Friedrichshafen, Germany had before them the problem of creating a naval flying boat for flights over the high seas which would be equally well adapted to long range reconnaissance and to bombing. The firm had for a foundation of its work the experience of many years derived from the multi-engined seaplanes it built during the war for the German navy.

For Long Range Scouting

Long range reconnaissance over the seas demands high ceiling to a less extent than ability to cover great distances at a good average speed. The machine being left entirely to its own resources during long flights over the open seas, its power plant must be particularly reliable. This makes it seem preferable to use two engines, each of which should be able to keep the machine in the air. If the seaplane is to have sufficient seaworthiness to land and maneuver on the water in heavy seas, the hull must have sufficient excess buoyancy and sufficient stability to dispense with wing tip floats which often are a source of danger in heavy waves. At the same time the machine should possess sufficient fighting power to be able to cope with enemy defense machines during raids.

The new Dornier "Wal" twin-engined flying boat offers a fine example of a flying machine satisfying these requirements. It is built as a monoplane over a strong boat body of great stability which, due to a suitable construction, is very seaworthy. The wing is placed at a sufficient height over the boat to be safe from coming in contact with wave crests even in a heavy sea. The two engines are arranged in tandem in a nacelle in the middle of the wings. The fuel tanks and the bomb load are located directly underneath in the closest proximity to the center of gravity. This concentration of the principal weight masses results in a flexibility which had never before been accomplished in long range seaplanes. The position of the propellers is such that even in taxiing in a ground swell there is no danger of damage from the spray.



Dornier "Wal" twin-engined flying boat, built for the Spanish air force. Fig. 3 shows the counter-balanced aileron; Fig. 5 is a close-up view of the landing gear

"If war were declared to-morrow what would we do for aircraft?"

A machine gun stand with a wide arc of fire is located in the bow of the boat, while another gun stand is located behind the wing to furnish protection against attack threatened from the rear.

The Dornier "Wal" is built completely of metal with the exception of the wing covering and the control surfaces. The vital parts subjected to high stresses are made of high grade steel, all other parts being of duraluminum. The safety factor with a normal load is six. The hull has two steps, the rear one being provided with a reinforced keel to give it great sturdiness in starting and landing. The patented Dornier buoyancy fins which are built onto the sides of the hull insure stability on the water and at the same time facilitate the starting. To insure flotation in case of damage, the hull as well as the hull fins have water-tight bulkheads.

The hull is built of a wooden framing with a plating of flat sheet duraluminum. The principal frames, in the middle of the boat, are particularly strong and are stiffened by means of steel bracing members. The hull is generally accessible through water-tight manholes fitted in the bulkheads, and it is strengthened by means of a number of longitudinal stringers which also protect the hull from damage which might be caused in towing the boat on shore.

The observer's seat with a flexible machine gun is placed in the front part of the boat, back of him is the pilot's seat and next to the latter is a place for a mechanic where a second control set can be installed if desired.

Wing

The wing is rectangular in shape, with slightly rounded edges, and is partly supported from the hull by means of four struts. The wing spars are of steel, while the ribs are of duralumin. The covering of the wings is airplane linen coated with cellon. The ailerons are of the counter-balanced type.

Tail Group

The tail group consists of a stabilizer with non-balanced elevators and a fin with balanced rudders. The elevators are controlled by a hand wheel, and the rudder by a bar. The control leads are steel rods of high tensile strength which are mounted inside of the boat where they can easily be inspected.

Engine Installation

The power plant consists of two engines developing from 250 to 400 hp. No changes of trim will result through changes in the weight of the engine installation, because both power units are set at equal distances from the center of gravity.

In the machines built so far two 300 hp. Hispano-Suiza engines have been used, giving the performances tabulated below.

Tentative performances are also listed for the 350 hp. Rolls-Royce and the 400 hp. Curtiss C12 engines.

The engines are built into the engine nacelle located above the wings, and are easily accessible, even in flight, which makes it possible to give them the best attendance and supervision.

Cooling

Two radiators are mounted in easily accessible positions between the two engines. The radiators may be used jointly for the cooling of a single engine in case one of the engines should break down, thus avoiding too high temperatures of cooling.

Fuel Installation

Four sheet brass gasoline tanks are placed inside the boat and supply sufficient fuel for a 6½ hr. flight. The fuel is pumped by means of a wind driven pump into a gravity tank located in the engine nacelle and is fed from the latter to the engines.

The oil tanks are also mounted in the engine nacelle.

Armament

The Dornier "Wal" carries an installation capable of carrying a bombing load of 900 kg. The size and number of bombs carried may be varied according to the customer's indications.

The defensive armament consists of two machine guns mounted on tourelles, one in the bow and the other aft of the wings.

Instruments

The following instruments are carried on board: altimeter, compass, two tachometers, air speed indicator, one gasoline gage for each tank and a clock.

Towing Arrangement

An arrangement for towing the seaplane, described below, has shown to give excellent satisfaction. This may also be supplied separately if so desired.

The towing system consists of two wheels of 1.7 m. diameter and 0.4 m. width which are built of sheet metal as hollow bodies and can support themselves by floating in water. They are mounted on the buoyancy fins by means of a tubular axle carried in suitable bearings. By the use of these wheels the machine is enabled to roll on land under its own power.

The wheels are put on in the following way: The wheel axle and the wedge are stuck into the fin with the help of a row boat and the wheel, being in a vertical position, is brought up with the help of an auxiliary axle. The latter is part way inserted into the hollow outer axle which is then pushed into the wheel by a simultaneous rotation and pulling of the latter. It is finally secured by means of a locking device. The removal of the wheels is brought about in the reverse order.

CHARACTERISTICS OF THE DORNIER "WAL" FLYING BOAT

Length overall, 17.25 m.	Maximum height, 4.8 m.
Span, 22.5 m.	Total wing area, 96 sq. m.

WEIGHTS AND FLIGHT PERFORMANCES WITH DIFFERENT ENGINES

Engines	*2-300 hp. Hispano-Suiza*	*2-350 hp. Rolls-Royce*	*2-400 hp. Curtiss C12*
Weight empty (incl. cooling water), kg.	2850	3100	3000
Useful load, kg.	1360	1600	1700
Weight loaded, kg.	4150	4700	4700
Max. permissible load	1900	1900	2000
Max. speed, km.p.h.	175	185	195
Min. speed, km.p.h.	100	108	108
Time of climb			
to 1000 m.	8′	6′	5′
to 2000 m.	19′	12′	12′
to 3000 m.	40′	22′	22′
Ceiling (approx.), m.	3800	4000	4300

Note—With a normal useful load, one engine will keep the machine in flight at 1000 m. height.

U. S. Airport Facilities

The Aeronautical Chamber of Commerce with the able assistance of the federal air services has computed the airports in this country, as follows:—Government 123; Commercial 184; Municipal 160; Seaplane 110; undeveloped facilities 1756—making a total of established and possible airports, 2,333.

Charles F. Redden, Charles S. Jones and Archibald Black have been appointed a committee on air terminals to advise and assist individuals, corporations and others in establishing land and water terminal facilities.

Panama Canal Air Defenses

Army and Navy experts on a recent inspection of the Panama Canal Zone accompanied by Senators and Representatives in Congress, on March 17 announced that while the Canal is adequately protected by fortifications to a range of twenty miles, it is absolutely essential that complete aircraft equipment be provided to protect the ground forces, the Fleet and the Canal. Recent maneuvers showed the ease with which an enemy fleet could get within striking distance, unless aircraft is employed to give warning and help in all defensive operations.

"If war were declared to-morrow what would we do for aircraft?"

Lightning Protector for Balloons and Airships

Lighter-than-Air Craft Safeguarded Against Static Electricity by Remarkable Invention

By S. R. Winters

When explorations are made above the surface of the earth observation balloons have heretofore been more or less at the mercy of static electricity. In consequence, not infrequently have these explorations been abruptly terminated with the fabric of the balloons taking fire.

Now, thanks to the inventive mind of A. Crossley, radio engineer of the Radio Division of the Bureau of Engineering, Navy Department, a device has been perfected for safeguarding kite balloons and airships against static electricity. Clouds laden with dust and moisture accumulate a charge of electricity, the strength of which is influenced by several factors—the distance traveled by the cloud, its speed, its height above the surface of the earth, and whether or not a collision of clouds invites the taking on of an additional charge of electricity. The latter condition assumes that the colliding clouds are of like polarity, for in the event they are of dissimilar polarity the accumulation of electricity is robbed of some of its power.

How the Problem was Solved

Mr. Crossley in approaching this problem, sought to devise certain agents whose functions would be to counteract the charge of electricity on the cloud by neutralizing the height of the latter from the earth and the polarity of the charge on the cloud. Admittedly, the earth and the electricity absorbed by the cloud are unlike in polarity. Hence, the lightning and static electricity protecting device for observation balloons assumes the form of a vertical conductor—whose variable services under different names and guises make of it a widely used appliance. This vertical conductor, which may be called an "antenna" of the clouds, brings the earth charge of electricity within reasonable limits to the moving clouds. The neutralizing effect accomplishes the end in view, namely, safeguards the balloon from ignition by a discharge of static electricity. If the cloud contains a small or medium amount of electricity this vertical conductor will permit of a neutralizing effect. If, however, the passing clouds are vested with a heavy charge of electricity the air path between the tip of the protective device and the nearest cloud will become ionized. A blue flame at the tip of the vertical conductor will be the inevitable result. As the charge of electricity will then be excessive, the air path will ionize to such a degree as to accommodate a path of low resistance over which the lightning bolt may spend its force.

With the exception of the lightning flash, all discharges of electricity from the sky to the earth by the way of this vertical conductor will be of an intermittent direct-current passage. The bolt of lightning, however, will be conveyed through the conductor in the form of an oscillation. Data on the electrical constants of the balloon circuit permit of easily determining what resistance should be inserted in the balloon circuit to dampen out any oscillatory currents created in the circuit either by lightning or brush discharge. Any circuit having inductance and capacity—similar to the balloon circuit, for example—will when acted upon by brush or lightning (spark) discharge, allow oscillating currents to be generated in the circuit. This principle is well known to radio engineers. The frequency of the generated current is proportional to the inductance and capacity of the circuit, and the strength of the current is directly proportional to the resistance of the circuit. To avoid the balloon circuit from oscillating in this lightning protective device when under the influence of atmospheric electrical discharges a resistance of 5,000 ohms is inserted in series with the cable. This resistance may take the form of a carbon or graphite rod, ¾ in. in diameter and 8 in. long, the ends of the rod being copper-plated. The General Electric Co. manufactures such designs of resistance units in values ranging from 500 to 30,000 ohms. The apparatus for throwing safeguards around observation balloons is of such a capacity as to convey any intermittent direct-current flow of electricity from a negligible amount up to 200 amperes. Its capacity in carrying a lightning discharge or an oscillatory current is restricted to approximately 50 amperes. For all practical purposes, accepting the conservative claims made for the invention, the apparatus is capable of throwing a cloak of protection around the kite or other altitude-climbing object. Excessive lightning disturbances may be beyond its control, but such occurrences are rare. Moreover, the peculiar virtue of the device is its ability, through the functioning of the discharge point on the balloon, to neutralize the major portion of accumulated electrical discharges on the clouds, thereby averting any lightning bolt.

The discharging element is located on the topnotch point of the balloon, making connection electrically with the steel downhaul. Such a commanding position for the discharger is in the interest of a removal of the exposed brushing or sparking surface to a point where no gas or fabric intervenes in the pathway of the cloud and the tip of the conductor. Previous attempts to establish artificial guardians for lighter-than-air craft have been handicapped by the presence of the body of the flying object between the tip of the conductor (steel cable) and the moving cloud. When the balloon was thus exposed, the ionized air duct or sparking path ignited the gas or occasionally the fabric took fire and, in consequence, ignited the gas.

A piece of copper braid for connecting the steel cable to the discharger, clamps for the steel cable, copper lugs for attaching to the cable clamp, a piece of galvanized iron pipe for making the ground connection, and the discharger, are among the integral parts of the protective device. One-half of an inch of copper Belden braid, in the flat shape as originally purchased from the manufacturer, is employed in linking the steel cable to the discharger. This strip of braid is fastened to the body of the balloon by cementing pieces of fabric over the former and to the fabric of the body. Flapping of the braid when encountering a strong wind is avoided by securing it to the downhauls by marline or a small line of two strands loosely twisted, this being placed at 12-in. intervals. The clamps for the ⅜ in. main steel cable and the ¼ in. auxiliary cables are made of brass. They are fitted with wing nuts which not only tighten the clamps but secure the copper lugs to the clamp.

The copper braid, leading from the winch, may be clamped to a galvanized iron pipe 6 ft. long and 1½ in. in diameter. The pipe should penetrate the soil to a depth of 5 ft. Such a ground connection will satisfactorily answer any temporary uses. If permanency is to be desired, the iron pipe should be displaced by radial conductors of flat copper ribbon or heavy copper wire buried under the surface of the earth. The four conductors, each 15 ft. long, should be interred under soil to a depth of 1½ ft. This applies to moist earth, but if the soil is sandy the conductors should extend into the ground until permanent moisture is tapped. A strip of braid is either connected or soldered to the gas valve of the balloon and then linked to the braid on the belly band. The metal parts of the balloon are intertwined electrically to the braid, thus insuring a like potential for all the metal parts of the flying unit. The discharger consists of a leather

cone which has a copper tip fastened to the top of the former by use of copper rivets. The tip is constructed so as to be pointed, having soldered to it a strip of braid which connects the tip to the braid on the body of the balloon through a contact plate, wing nut, and copper lug. Such an arrangement facilitates the carriage of the discharger from one place to another.

Once the parts are available, installation on this lightning protector for service in the sky is comparatively easy. The copper braid is fastened to the body of the balloon after the soldered connections have been made and the discharger secured to the top of the aircraft. The braid forming connection between the belly band and the ¼ in. cable downhauls are then secured to the hemp downhauls, being made fast to the ¼ in. cable with clamps. The latter are then linked to the ⅜ in. main cable with braid jumpers and clamps. The balloon is permitted to ascend to the required height and the ground connection is made to the main cable by means of braid and clamps. Two copper lugs are bolted to the frame of the winch and connected to the grounding braid. This provides another electric path to the earth for the surges in the cable, thereby saving the operators from an electric shock when the ground lead and cable are hooked-up.

Used on Naval Aircraft

Critical test of the efficiency of this invention against lightning to exploration balloons can only be applied to an isolated flying unit. Any other balloons not equipped with this arrangement soaring to the immediate vicinity of the test unit will be partially safeguarded from static electricity by the neutralizing effect of this apparatus. Therefore, it is suggested that an unprotected balloon be flown at a reasonable distance from the unit being favored with the neutralizing agent as a means of determining the value of this form of lightning protection. The distance between these two flying units can only be determined by experiments during unfavorable weather conditions, thunder storms, for instance. Such observations will involve the use of instruments for measuring the electric charge in the cable. Direct-current ameters and voltmeters, or preferably galvanometers, may be employed in making these measurements. The measuring instruments may be connected in series with the ground lead, but from the viewpoint of protecting the instruments, it is suggested that the main cable or ground lead be used as a shunt across the former, such a method will afford data indicating the voltage, current in passage, and the electric charge in the cable.

The inventor has applied for a patent by which he can safeguard his priority of discovery. Meanwhile, the Bureau of Aeronautics, Navy Department, has had this lightning arrester installed on eight balloons. Observation kites employed by the Navy will in the future be likewise safeguarded by this novel device.

National Balloon Race

The National Aeronautic Association announces that the entry of fourteen balloons in the National Balloon Race to be held in Indianapolis between June 9 and July 4 is assured. The balloons which finish first, second and third in the race will be the American entries in the international balloon race at Brussels, Belgium, Sept. 23, for the James Gordon Bennett trophy.

The American race will be held under the auspices of the N.A.A. and the Aero Club of Indianapolis, assisted by the Indianapolis Chamber of Commerce which has guaranteed the expenditures in connection with the meet. The Army and Navy will probably be represented by four entries and four new balloonists have filed entries with the contest committee of the N.A.A. Indianapolis will put up a purse of $3,000 for division among the contestants. With favorable wind and weather it is confidently expected that the American distance record of 1,172 miles for free balloon flight, held by Allan Hawley of New York, will be broken in the forthcoming balloon race.

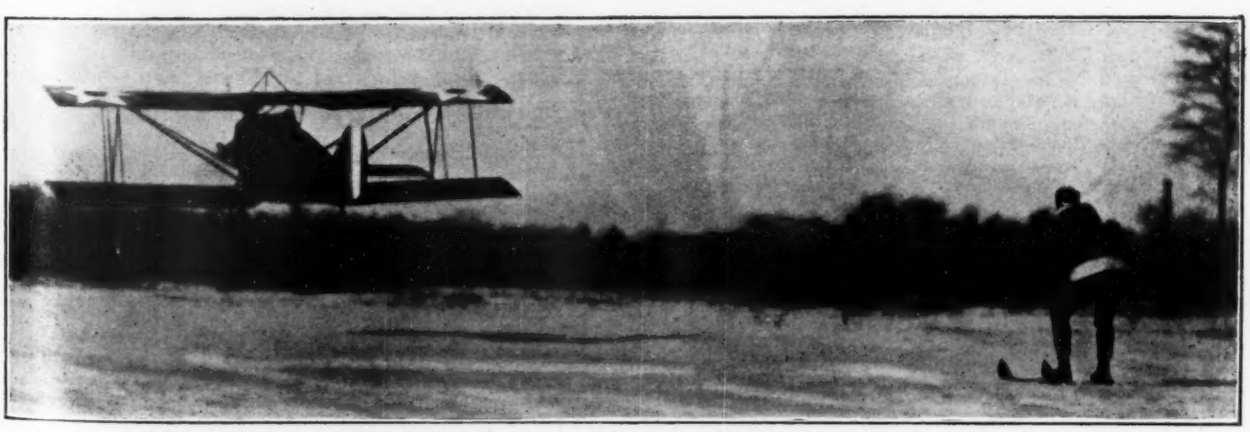
New British Air Line Proposals

The British Air Ministry has just announced that it is prepared to receive proposals from responsible persons for the formation of an air transport company on the lines indicated by the Secretary of State for Air in the House of Commons on March 14, arising out of the recommendations of the Civil Air Transport Subsidies Committee. This report was published in the March 26 issue of AVIATION.

As the proposed company may have to start operations on April 1, 1924, it is desirable that it should come into existence at an early date. The Air Ministry, without imposing a specific time limit for offers, desires to announce that it holds itself at liberty to close with any offer which they regard as satisfactory by July 1, and in order that offers may receive full consideration it will be advisable that outline proposals should be made by May 1.

Aviation in Spain

Heraclio Alfaro, correspondent in Spain of the Aeronautical Chamber of Commerce, writes that $235,000 has been appropriated to subsidize the operations of the Spanish air mail services, $5,520,000 has been appropriated for the army air service and $1,701,000 for the navy air service. The Government within the next few months is expected to guarantee about $31,000,000 for the complete establishment of the Seville-Buenos Aires airship line.



"Sky-planing"—a new sport initiated by Lawrence Sperry, which consists in being towed on skis by a U. S. Messenger airplane

"If war were declared to-morrow what would we do for aircraft?"

Employment and Specifications of Pilot Balloons

By George V. Whittle, Lieut. (C.C.) U.S.N.

Pilot balloons are small balloons employed for the purpose of determining the direction and velocity of the wind at various altitudes. They are usually released at certain definite intervals from meteorological stations and from stations or ships to which aircraft are assigned. It is also customary to release pilot balloons a short time before aircraft are sent up so as to furinsh the aviator with information regarding the wind aloft.

Employment of Pilot Balloons

The following description gives an idea of the method employed in determining the wind conditions aloft with pilot balloons. The balloon is usually inflated with hydrogen from a flask until certain predetermined "free" lift (usually expressed in grams) is obtained. For a balloon of a given size, this "free' lift determines the velocity of ascent which is usually expressed as so many meters per second. At definite time intervals, (usually one minute) observations are taken on the balloon by means of one or more theodolites. The theodolite gives the azimuth and elevation angles of the balloon at the end of each time interval.

With this data, and knowing the rate of ascent of the balloon (from the free lift allowed), the position of the balloon relative to the starting point can be calculated with respect to the elapsed time. It is customary to plot the path of the balloon from which the wind direction and velocity at any altitude can be determined, up to the maximum altitude that the balloon was observed.

Pilot balloons are made in various colors. In the Naval Service, three colors, viz: natural gum (tan), black and red, are used. The reason for various colors is that each one shows up best under certain cloud and visibility conditions. More colors than the above are not necessary as one of these three will be found satisfactory for any condition under which observations can be taken. An experienced observer can be depended upon to select the proper color for any given set of conditions.

In the Naval Service, pilot balloons of the 6 in., 7½ in. and 9 in. size are used. The nominal diameter of the form upon which the balloon is made is used to designate its size; that is, a 6 in. balloon is made on a form approximately 6 in. in diameter.

Specifications for Pilot Balloons

The following is an extract of the Naval Observatory's specifications for pilot balloons:—

"The balloons shall be made of pure para gum of good quality, without blemish and in general, equal to those now in use in the Naval Air Service. Colored balloons to be of good even color. Dark balloons to be opaque when inflated, pigment not to have a deteriorating effect. A reasonable number of patches covering pin holes or blemishes will be allowed, provided these do not detract from the expansion of the balloon nor increase its weight beyond the allowed limit. To inflate to a shape practically spherical. Appendix to be 2 in. long, and 1¾ in. in diameter.

"Balloons shall be practically uniform as to size and weight, weights deflated and diameters to be in accordance with the following table:—

Diameter deflated	6 in.	7½ in.	9 in.
Weight limit	26-34 gr.	40-50 gr.	44-56 gr.
Capable of inflation to	28 in.	37½ in.	45 in.

"Balloons should be capable of being expanded to diameters given without undue strain on material."

A Successful Power Plant

One of the outstanding aeronautical achievements of the past year was the development, by the Lawrance Aero-Engine Corp. of New York, of the first satisfactory American radial air-cooled engine. This engine, Model J1, develops normally 210 hp. at 1650 r.p.m. and a maximum of 245 hp. at 1950 r.p.m., and has a fuel consumption of 0.48 lb. per horsepower hour and an oil consumption of 0.03 lb. per horsepower hour. Its weight complete is 443 lb.

It was with this engine, fitted to a Navy type TR float seaplane, that Lieut. A. W. Gorton, U.S.N., won the last Curtiss Marine Flying Trophy race at Detroit, last October As the Lawrance J1 engine recently made a successful 200-hr. endurance run under the supervision of naval aircraft inspectors, it will be seen that this power plant has uncommon qualities of sturdiness and reliability.

As a result of these practical demonstrations, Lawrance engines are being installed in a great many aircraft now under construction, as may be seen from the following notes.

The Naval Aircraft Factory and Curtiss Aeroplane & Motor Corp. are installing J1 engines in the Navy TS plane. The Glenn L. Martin Co. is using the Lawrance in a new single-seater flying boat known as the "MS" plane. The Cox-Klemin Co. is also installing the same engines in a somewhat similar ship for the Navy known as the MX. The Chance Vought Corp. is starting to install the Model J engine in a number of UO1 seaplanes, which is the type of two-seater that appeared first at the Curtiss Marine Trophy Race at Detroit. The Huff-Daland Co. is installing the Model J engine in the TA ship, which is a two-seater advanced training machine, and in the Navy HO type seaplane. The Dayton-Wright Co. is installing the Model J1 engine in the PS1, a single seater pursuit monoplane known as the Alert type. The Lawrance Sperry Aircraft Corp. is installing the Model L4 engine in a number of Messenger planes which he is building for the Army.

The engineering division at McCook Field has a number of Lawrance engines on hand and is experimenting with them in a number of ships such as the Elias and the Huff-Daland.

Finally, a J1 engine is being installed in the Berliner helicopter in Washington.

Paris to Belgrade Air Service

The Compagnie Franco-Roumaine, says U. S. Consul K. S. Patton, Belgrade, Yugoslavia, in a report to the Department of Commerce, has obtained a concession for an airplane service linking Belgrade with Paris, Budapest, Vienna, Bucharest, and Constantinople. The service was scheduled to start Feb. 15, but operations are not expected to begin until the middle of March as the landing field at Belgrade requires considerable preparatory work. The Yugoslavian government is to put this landing field in order, and is to pay an annual subsidy of 2,000,000 dinars ($20,000, at rate of March 5).

The trip from Belgrade to Bucharest is scheduled to take only three hours, and that from Constantinople to Belgrade will require seven or eight hours. From Belgrade to Paris is about eight hours. Until May 1, 1923, there will be three trips weekly on each service, and after that date daily services will be maintained.

"If war were declared to-morrow what would we do for aircraft?"

U. S. Captures Duration and Distance Records

Lieuts. Oakley G. Kelly and John A. Macready Fly 36 hr. 5 min. 20 sec. in Army Fokker T2

Official Photo, U. S. Army Air Service

Thirty-six hours in the air: the Army Fokker T2, its crew, Lieuts. O. G. Kelly (with cap) and J. A. Macready, and the fuel load it carried on the record-breaking flight

New world's duration and distance records were made April 16-17 at McCook Field, Dayton, Ohio, by Lieuts. Oakley G. Kelly and John A. Macready, Air Service, who remained aloft 36 hr. 5 min. 20 sec. covering a distance of 2541.2 miles. This splendid performance was made around a 50-kilometer course specially laid out for the purpose and surveyed by Maj. James W. Bagley, Corps of Engineers, U.S.A. The airplane used was the Army Fokker T2 monoplane fitted with a Liberty XII engine on which the same officers last fall made a duration flight of 35 hr. 18 min. 30 sec. and a cross country flight of 2060 miles from San Diego, Calif., to Fort Benjamin Harrison, Ind., neither of which performances could be homologated as they were not made in accordance with F.A.I. rules.

The previous official duration and distance records were made Oct. 13-14, 1922, by the French pilots Bossoutrot and Drouhin with 34 hr. 18 min. 30 sec., and 1190 miles, respectively, on a Farman Goliath fitted with two 300 hp. Renault engines.

Performance Officially Observed

The new records, while not yet homologated at the time of writing, were officially observed by contest officials of the National Aeronautic Association of U.S.A. which represents the International Aeronautic Federation (F.A.I.) in the United States. It may be confidently expected that the records will be officially homologated. It seems probable that Lieutenants Kelly and Macready can also claim new speed records for the F.A.I. recognized distances of 2500, 3000, 3500 and 4000 kilometers. No records for this class have so far been filed with the F.A.I.

It is furthermore likely that new load carrying records for distance and duration were established in the course of this flight. The F.A.I. recognizes the following amounts of useful load carried exclusive of the pilots' weight: 250, 500, 1000, 1500, 2000 and each additional 1000 kilograms.

The Great Flight

The two pilots took off from McCook Field at 9.38 a. m. on Monday, April 16. The big Army Fokker had been tuned to the highest possible degree by the best mechanical skill of the Engineering Division. It looked as spick and span as a model in a display window and had been thoroughly reconditioned and overhauled for these grueling tests. It should be borne in mind that in this flight the structure of the T2 was taxed to the limit with the stress of the great load carried (739 gal. of gasoline—4400 lb.—and 35 gal. of oil—262 lb.) while the single Liberty engine was required to run continuously for two nights and a day. It is especially significant to note that when the T2 took off she lifted by well over 2,000 lb. the heaviest weight ever carried by a single-motored airplane. This plane is capable of lifting 10,850 lb. in safe flight. Approximately one mile of runway is required for it to clear the ground with its maximum load, whereupon it is able to climb to an altitude of 4,000 ft. during the first hour.

The T2 has a wing span of 74 ft. 10 in., a height of 11 ft. 10 in., a total wing area of 958 sq. ft. and an overall length of 49 ft. It is capable of attaining a speed of from 75 to 110 m.p.h., depending upon the extent of the load carried.

Traveling over the 50 kilometer triangular course, the two pilots exceeded the French record at 8 p. m. on April 17. On the afternoon they had dropped a message on McCook Field which read as follows:

"Wilbur Wright Field: We will probably land about 9 or 10 o'clock. Have searchlights placed to give us the longest approach and landing area, so that we can land into the wind with our left side to the lightest part. Provide some means that will enable us to tell the direction of the wind—smoke might do."

At 9.43 p. m. the big monoplane made a landing on McCook Field.

"If war were declared to-morrow what would we do for aircraft?"

Since last February Lieutenants Kelly and Macready made three attempts to start on their duration flight. The first attempt was postponed due to a sudden change in weather, the second attempt due to the softness of the ground at Wilbur Wright Field, while a third attempt was interrupted by engine trouble. Undaunted by these setbacks, the two pilots made a fourth attempt and brought back to America the coveted duration and distance records.

A Transcontinental Flight

It is the intention of the Army Air Service to have Lieutenants Kelly and Macready attempt another transcontinental flight before long. With this end in view the T2 will be completely overhauled and fitted for the transcontinental non-stop flight. It will be recalled that these two airmen attempted this flight on November 3 last from San Diego, Calif., to New York City, but due to a cracked water jacket only got as far as Indianapolis, Ind. The second attempt to fly uninterruptedly from coast to coast will be from east to west instead of vice-versa.

Several things have been brought to light to influence the change. It is figured by the pilots that by taking off at New York they won't be handicapped by having to cross high mountains at the outset with the maximum load. It is also believed that a distance of 400 miles can be gained in the change by directing a straight line course to Las Vegas, thence directly westward over the mountain peaks to San Diego, made possible by the lightened weight in consumption of fuel. Both pilots of the T2 and officials of the Engineering Division are confident that the T2 is capable of making the ocean to ocean journey.

Other Speed Records

New speed records over the recognized distances of 1500 and 2000 kilometers were also made at McCook Field on April 17. Lieut. Harold Harris, A.S., who already holds the world's speed record for 1000 kilometer distance with 4 hr. 52 min. 39 sec., covered 1500 kilometers in 8 hr. 9 min. and 2000 kilometers in 10 hr. 53 min. He established these records with a DeHaviland RB fitted with a Liberty engine, over the 50-kilometer course around which Lieutenants Kelly and Macready were flying for their duration and distance records. Lieutenant Harris' flight lasted from 6.28 a. m. to 5.21 p.m. His average speed for 2000 kilometers works out as 114 m.p.h.

New Wind Tunnel at McCook Field

A new wind tunnel, which will afford much more convenient aerodynamic facilities than have hitherto been available, has recently been completed and put in operation at McCook Field, writes J. C. Branham in the Air Service News Letter. Construction was begun in June, 1921, and the tunnel was completed in the summer of 1922. Since that time the plant has been in continuous operation, evaluating coefficients of aerofoils, model airplanes, etc.

The tunnel is 96 ft. in length, with an airstream 5 ft. in diameter, and requires the exclusive use of a standard 140 ft. hangar. It is not a large tunnel when compared with some of those being used abroad, but the size of the power plant makes possible an unusual speed capacity, with a maximum of 275 m.p.h. Each of the two fans is driven in tandem by two Sprague dynamometers, which were reserved from testing equipment formerly used for Liberty engines. Economy of first cost was thus achieved together with efficiency of operation.

A delicate balance, capable of measuring forces to one ten-thousandth of a pound, is located beneath the tunnel. This balance was built by a manufacturer of telescopes, the design being based on an English type. A new wire balance for use at the higher speed ranges will soon be built.

The recent test of the Barling Bomber may be cited as an example of the method using the tunnel. A 1/70 scale model, complete with the exception of propellers, was made in the pattern shop, the rudders, ailerons, elevators, etc., being movable. A series of tests was then made to determine the degree of stability, together with the lift and resistance. The rolling, pitch and yawing tendencies were measured in inch-pounds with the control surfaces in various positions. From this data it was possible to predict the proper tail setting and the probability of easy control for the full-size airplane.

A test represents about one per cent or less of the total cost of a new experimental airplane. If a novel and untried design be shown by wind tunnel tests to be faulty, it is apparent that, neglecting enginering costs, 99 per cent of the project cost is saved, as compared with trial by actual flight.

Russian Air Activities

An air transport company with a capital of 800,000 gold rubles was recently created in Tiflis, Caucasian Republic. According to newspaper dispatches this enterprise was established upon instructions of the Russian Supreme Council of National Defense, and its pilots will be drawn from the Red Air Fleet school at Tiflis.

The Caucasian air line has at present twelve landplanes and eight seaplanes, which are to be used for permanent aerial communications from Tiflis to Baku and Erivan, to Angora and to Tabriz, Persia.

The military and political importance of these air lines is obvious, for they will establish rapid communications between Soviet Russia on one hand, and Turkey and Persia on the other.

A further instance of the attitude of Soviet Russia toward air power may be found in an article printed in a recent issue of the Air Fleet Messenger, the Soviet aeronautical organ, in which the writer emphasizes the necessity of creating a strong air force in the Republic of Turkestan for the purpose of seconding the revolutionary movement in British India. Still another instance of this kind is afforded by the news that Afghanistan has begun to organize an air force and that the first consignment of nine airplanes has reached there from Russia.

Boston Aviators' Ball

Boston's annual aviation ball, at which the Aero Club of Massachusetts plays host to Boston society and famous fliers of the naval and military air forces, will be held on the evening of May 4 in the ballroom of the Copley-Plaza.

Usually one of the first events after Lent, the ball was postponed this year until the height of the spring season because of the club's plans to make this year's assembly more brilliant than any of the preceding ones. It is expected that the assembly will put the club's building fund "over the top" and enable the organization to construct a simple "shack" clubhouse on the new landing field at East Boston.

The New Air Convention

In a press conference on March 28, at Washington, D. C. Mr. Phillips of the State Department was asked regarding the report that this Government would, within three months, call a convention to regulate radio and aircraft. He replied that this was a very long story and that he would rather reserve comment upon it for the time being.

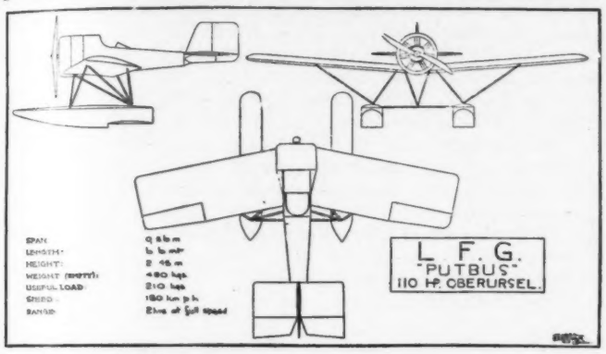
In answer to a further query the Under Secretary stated that this matter had nothing to do with the Commission of Jurists which recently met at the Hague.

"If war were declared to-morrow what would we do for aircraft?"

The L.F.G. "Putbus"

The L.F.G. "Putbus" built by the Luft-Fahrzeug-Gesellschaft m.b.H., Straslund to the designs of Herr Baatz is a small single-seater tractor float monoplane developed primarily as a shipplane.

All the parts, with the exception of the front part of the fuselage containing the engine, fuel tank and engine controls, are constructed to pack into five sheet-steel cylinders. The first and second cylinders contain one float in each and part of the float struts; the third cylinder holds one wing, tail plane, and fin; the fourth, the second wing, elevator, rudder



Courtesy *The Aeroplane*

Outline drawings of the L.F.G. "Putbus" shipplane

and propeller, while the fifth contains the fuselage including controls and short-float struts. These cylinders are made of Siemens-Martin hard sheet steel, those for use on surface craft being made fairly light, whereas for use on submarines they are made strong enough to withstand an external pressure of six atmospheres.

The "Putbus" is built entirely of duralumin. The fuselage is constructed in three sections. The nose portion which contains the engine, a 100 hp. Oberursel, two fuel tanks, suitably isolated between fireproof bulkheads, and the instrument board, is the only unit that is not stowed in a cylinder it being either carried on deck of a surface ship or stowed in one of the diving tanks of a submarine. All instruments are so arranged that no pipes or levers have to be disconnected when the airplane is dismantled.

The center portion of the fuselage includes the pilot's seat and controls, while the third section carries the tail unit. The wings which are back-swept are constructed in such a way that they can be folded lengthways along both spars. The rudder, elevator and aileron controls do not require to be dismantled when the aircraft is taken to pieces. The stabilizing and control surfaces are of large area.

The floats are of typical German aspect and constructed entirely of duralumin. The "Putbus" can be dismantled and packed in the cylinders in fifteen minutes and can be assembled in half an hour.

Soaring Flight Prize

Apparent apathy on the part of American sportsmen to offering prizes for soaring flights has prompted Prof. J. W. Miller, president of the J. W. Miller Aircraft Corp., of Seattle, Wash., to offer two prizes for soaring flights on machines of his design or manufacture. The conditions and the awards are:

To anyone, using a machine built from drawings of the J. W. Miller Aircraft Corp., who officially exceeds any world's soaring record, will be awarded a prize of $25.

To anyone, using a machine wholly manufactured by the J. W. Miller Aircraft Corp., who officially exceeds any existing world's soaring record, will be awarded a prize of $250., or the price of the machine.

Aero Eng. Society of M.I.T.

Edmund T. Allen, president of the Aeronautical Engineering Society at the Massachusetts Institute of Technology, who recently returned to this country after attending the various gliding meets in Europe addressed the society at a meeting on March 2. His talk was an account of the French, German, and English competitions which he attended, and was illustrated by lantern slides showing the most prominent gliders participating in these contests. He described gliding as the greatest sport in the world, and believes it has an extremely promising future. Mr. Allen intends to continue his activities in the science of gliding to an even greater extent in the future

After the meeting, moving pictures were shown of Allen's last flight in the second M.I.T. glider in Germany. In this flight the machine was wrecked, and seeing these moving pictures of the flight was Allen's first opportunity to determine exactly what happened at the time of the accident.

It will be remembered that it was Mr. Allen who was very largely responsible for the construction of the M.I.T. gliders by the Aeronautical Engineering Society a year ago. Last summer Mr. Allen, with O. C. Koppen and H. C. Karcher, comprising the M.I.T. glider team, took these two gliders to Europe where one of them was flown by Allen in the International Gliding Competition held at Clermont-Ferrand, France. This machine was the only glider representing America in the competition. During the time that Allen took part in the contest his performance was not excelled by that of all other competitors combined. He was later eliminated from the contest by an accident which disabled the glider. Mr. Allen later made some flights with the second M.I.T. glider in Germany, and since then has made a study of the art of gliding at the other meets which have been held.

Dusenberg Motors Case

A decision in favor of the Government involving the repayment of $638,748.30, in the Dusenberg Motors case, and one of great importance in the prosecution of War Frauds suits, has just been handed down by Judge Bodine in the United States Court for the District of New Jersey, it is announced by the Department of Justice.

The case was originally a claim of the United States against the Dusenberg Motors Corp. for over a million dollars alleged to have been overpaid that corporation on a contract for airplane motors during the war period, and which it was desired to prosecute after the affairs of the Dusenberg concern had passed into the hands of the Willys-Knight Corp. as receivers. Judge Bodine's decision is, in effect, that the Government has a valid claim against the Willys company, although the latter company and its entire assets were later placed in the hands of receivers.

News from Amundsen

Pilot Omdal, aviator for the Amundsen North Pole Expedition, writes from Wainwright, that he intended to fly to Norway last summer but the ice situation was so unfavorable that they did not reach Wainwright until the end of August, when it was too late to undertake the flight. The polar explorers now plan, the letter states, to fly to Spitsbergen in the latter part of June.

The letter, long delayed in transit, was relayed by dog sled to the postal station at Kotzebue on Dec. 4, but did not reach Bergen, Norway, until February. Several exploring flights are understood to have been made in the northland by Omdal and Dahl, the second pilot, but only two men will be carried on long trips due to the weight. In the projected flight Omdal and Captain Amundsen will fly to Point Barrow and from there directly to Spitzbergen, a distance of 2250 miles.

"If war were declared to-morrow what would we do for aircraft?"

ARMY AND NAVY AIR NEWS

U. S. Army Air Service

Army Orders—Capt. Carl W. Connell, A.S., Aeromarine Plane & Motor Co., Keyport, N. J., appointed special inspecting officer at plants of Aeromarine Co.; Wittemann Aircraft Corp., Hasbrouck Heights, N. J.; and Thomas Morse Aircraft Corp., Ithaca, N. Y.

Staff Sergt. Ananias Nikulaine, detachment 22d Obs. Sqd. Pope Field, Fort Bragg, N. C., transferred with same grade to 6th Composite Group headquarters, Panama Canal Dept. Staff Sergt. John J. Fitzpatrick, France Field, C. Z., to take his place at Pope Field.

Sec. Lieut. Guy William Ade, A.S.O.R.C. Tech. School, Chanute Field, promoted to first lieutenant, A.S.O.R.C.

First Lieut. Frank B. Tyndall, A.S., from duty with Boeing Co., Seattle, Wash., to sail on or about July 10 via San Francisco to Hawaii.

Maj. Lawrence S. Churchill, A.S., from Americus A.I.D., Georgia, to Omaha, Neb., to duty with A.S. troops.

Capt. Albert D. Smith, A.S., retired from active service as incapacitated on account of disability.

A board of officers all the combatant and non-combatant branches has been appointed by the War Department for the purpose of preparing a course on "Organization" for use in all branches of the Correspondence Schools for the year 1923-24. The Air Service is represented on the board by First Lieut. Theodore J. Koenig, A.S.

• • •

Air Service Reserve Activities in Ohio—The organization of Headquarters 306th Group (Pursuit), 416th Squadron (Pursuit), and the 83rd Division, Air Service, consisting of one Observation Squadron, one Photo Section and one Intelligence Section, all allocated to Columbus, Ohio, and vicinity, is progressing rapidly. Lieut. Langhorne W. Motley, A.S., reported on March 1 to Fort Hayes, Columbus, Ohio, for duty with the above units.

The high enthusiasm of the Columbus Aero Club continues. They are doing everything in their power to make the Air Service Reserve of Columbus and Franklin County a great success.

The Purol Company has placed a field at the disposal of the government. This field is the Fifth Corps Area Headquarters Flying Field. It is about one-half mile square, is south of and borders on the Old National Pike, six miles east of the center of Columbus. Twenty-eight thousand dollars for construction and five thousand dollars for the field lighting system have been appropriated and already allotted for these purposes, and the contracts for the work have been let. The initial equipment will be nine Curtiss training planes and one DeHaviland service plane. Two steel hangars will be erected in the very near future.

Work on the project is in progress, and with the excellent active cooperation of the constructing quartermaster and the whole-hearted assistance of the people of Columbus, it is only a matter of a very short period before this field will become one of the best of its type in the United States.

• • •

General Patrick on Inspection Tour—Maj. General Mason M. Patrick, Chief of the Army Air Service, left Washington on April 7 for San Antonio, Tex., his first stop on a tour of inspection of Air Service stations and flying fields in the southwest and on the Pacific Coast. Part of the trip will be made by airplane.

447 Pursuit Squadron Activities—The sixth monthly meeting of the 447th Aero Squadron (Pursuit) was held at the Army and Navy Club, New York City, April 12. Among the subjects brought up was that of squadron insignia. Although this is the only active squadron of the 314th group they are going to adopt an insignia which can be used for the entire group, each squadron having a different device. This carries out the idea introduced by "Les Cigognes" during the last war.

The members expressed the opinion that inasmuch as flying duty involves risks not incurred by other line officers, Air Service reserve officers should receive flying pay whether or not they are on active duty, provided they fulfill the requirements for minimum time, etc. In order to add weight to these views the entire membership will join the National Aeronautic Association.

A large percentage of the membership of this squadron will attend the training camps this summer. An effort is being made to have as many of these men as posssible attend the camp from June 1 to June 15.

• • •

Search for Lost Fliers Abandoned—A special searching party which recently set out from Rockwell Field in an attempt to find some trace of Colonel Marshall and Lieutenant Webber, who have not been heard from since their departure on Dec. 7 last from Rockwell Field to Fort Huachuca, Ariz., via airplane, returned to Rockwell Field on Feb. 22, their efforts being unrewarded.

The detachment, consisting of Maj. T. C. Macauley, Capt. H. A. Erickson, Lieuts. J. P. Richter and V. Hine, and Privates Martin and King, left Rockwell Field on Jan. 15 by automobile to search the route flown over by the lost airmen. Their seach of the deserts and mountain sides between Rockwell Field and the Mexican Border lasted six weeks, and extended as far east as Nogales, Ariz. They report that every effort was made to locate the lost plane but without avail.

• • •

Improvements at Scott Field—The construction of the new gas plant at Scott Field is progressing rapidly. Both the electrolysis and the oil cracking units are expected to be in operation within the next few months. The contractors have been delayed in their work during the past month by snow and cold weather.

The Operations Department at Scott Field, Belleville, Ill., has moved its offices from the north to the south end of the large airship hangar, where there will be more room. In connection with this department, a large study room is being equipped with tables, lockers, maps and technical data, so that the student pilot may have a place to work out practical problems assigned to him before going up on his flight.

• • •

New Pursuit Planes for Selfridge Field—Selfridge Field, Mt. Clemens, Mich., has recently received several of the new PW5 Fokker pursuit ships. These are now in operation, being given daily service tests. Their value as pursuit ships has not yet been determined.

• • •

TC1 Makes 500 Mile Flight—The TC1, largest non-rigid airship of the United States Army, landed at Scott Field, Belleville, Ill., on April 9 at 5.40 p. m. successfully completing a 500 mile flight from Wingfoot Lake Station, Akron, Ohio.

"If war were declared to-morrow what would we do for aircraft?"

Landing in the Kentucky Hills—While on a cross-country flight, Lieut. George V. McPike, Supply Officer at the Fairfield Air Intermediate Depot, Fairfield, Ohio, was forced to land on account of darkness in the Kentucky mountains in the district inhabited by the Ballard Brothers, who are purported to have shot up a large portion of the revenue force of Kentucky not very long ago. Incidentally, he says that the moonshine was not sufficiently in evidence to permit him to fly at night, and he had great difficulty in locating a landing field in the hills, 40 miles from a railway.

The natives had never seen an airplane, and their suspicion of the officer and astonishment on seeing the plane were about equal. It was with great difficulty that they were persuaded that the outfit was not a part of the revenue force and that McPike and his mechanic were not "Revenoors". It was necessary to cart gas and oil over the mountains with a team of mules. The gas was so poor that it was impossible to start the ship, so there was no other alternative but to "hoof" it over the hills for about ten miles to a country store where the proprietor owned a Ford. This individual agreed to take them out to civilization for $20.00. The repairs on the Ford must have totalled at least twice that amount after the trip.

Three husky mountaineers were taken along to lift the machine out of the mud holes and boost it over the rocks, and the journey of 40 miles was made at the rate of about five miles an hour, which the inhabitants declared was record-breaking time for that season of the year.

* * *

Photographing Waterway Facilities in Texas—Two planes from the 22nd Photgraphic Section at Kelly Field, Tex., left during the latter part of February on a photographic mission for the purpose of photographing harbors and waterway facilities at Houston, Galveston, Texas City, Beaumont, Port Arthur, Sabine and Orange, Tex. The day after the flight arrived at Ellington Field the weather started to take a turn for the worst, and for one week it was extremely hazy and cloudy, with rain almost every day.

On the afternoon of the fourth day it cleared sufficiently so that one attempt was made to photograph Texas City, Houston and Galveston, but a heavy haze, about 300 or 400 ft. in depth, prevented any satisfactory results being obtained. This was the only chance the flight had to make any photographs, and as the weather reports for the days that were to come predicted the same sort of weather for an indefinite period, it was decided to come home and make the attempt another time.

Very poor weather conditions prevailed on the trip home, with a ceiling between 400 and 600 ft.

* * *

Lecture on Bomb Release Equipment—J. R. Moser, Aeronautical Armament Engineer, stationed at McCook Field, Dayton, Ohio, paid a brief visit to the Aberdeen Proving Grounds, Md., during which time he made a model installation of a Mark A2 bomb rack on a DH4B, inspected and tested the H2 rack, installed on the L.W.F. "Owl", and made a general inspection of all bomb racks at the Field. Later he gave a lecture on racks, shackles, releases, bomb hoist, etc., covering practically all equipment of the kind on the field. This lecture was attended by all Air Service officers, and numerous problems which heretofore have been puzzles were made clear by Mr. Moser.

* * *

Enlisted Reserve Corps Squadron at Fairfield—The 347th Service Squadron, Air Service Enlisted Reserve Corps, organized at the Fairfield Air Intermediate Depot in June, 1922, consists of a personnel of ex-service men who saw service during the World War, over ninety per cent of the men being employed at the Depot. They are classified as Expert Aviation Mechanics. The commissioned personnel consists of Capt. George Walter Rogers, A.S., O.R.C., Commanding; Lieuts. James N. Robinson, John L. Rosensteel, Glenn D. Morris, Robert A. Kelly, Carleton F. Davidson and Robert A. Althoff.

New Pony Blimp Arrives at Scott Field—A new Pony Blimp, A5, one of a group of airships to be delivered by the Goodyear Rubber Corp. to the Government within the next few months, has just arrived at Scott Field. Piloted by Maj. H. A. Strauss, Air Service, who commanded the Airship C2 on its transcontinental flight last fall, and with Master Sergeant W. J. Bennett as engineer, the Blimp took off from Wilbur Wright Field, Fairfield, Ohio, at 8.00 a. m. Saturday, March 10, and arrived at Scott Field, Belleville, Ill., at 5.20 p. m., making an uneventful non-stop flight of 350 miles in slightly over 9 hr.

The airship will remain at Scott Field for the purpose of carrying out experiments in the attempt to replace the type "R" Captive Balloon for observation purposes.

Major Strauss, who is in command of the Lighter-than-Air activities at Wilbur Wright Field, reported that the rubber company has a new ship of the C type about ready for delivery. This ship will also be stationed at Scott Field.

* * *

Flying Activities in Hawaii—During the month of January the 5th Composite Group, Air Service, Luke Field, carried out 285 missions for a total of 81 hr. 38 min. The activities for the month consisted of bombing practice, squadron maneuvers, attack and bomb raids, offensive and defensive patrols conducted from the alerte, in some cases the command patrol operating with radio and message bags.

Acting on orders from Department Headquarters, the Group greeted the visiting Rotarians aboard the S.S.H.F. "Alexander" with a flight of three planes from each squadron. In spite of the low clouds and rain, they were able to pick up the liner about 15 miles off Diamond Head, and after entertaining the visitors with formation maneuvering for half an hour returned to the Airdrome. A farewell formation was flown over the U.S.A.T. "Cambrai," which sailed on Jan. 22 with Major Curry, former Department Air Officer, and Lieutenants Foster and Rice from Luke Field.

* * *

New Laboratory for Seventh Photo Section—The Seventh Photo Section stationed at the Fairfield Air Intermediate Depot, Fairfield, Ohio, has moved into its new laboratory quarters. The accumulated missions will be undertaken in the near future. The laboratory, with perhaps the exception of the laboratories of the Photographic Section at Chanute Field, is considered to be the best in the service, and the latest equipment has been installed.

Coming Aeronautical Events

AMERICAN

May 30 — *Fifth Annual Aircraft Exhibition, Flying Club of Baltimore, Logan Field, Dundalk, Md.*

June or July — *National Balloon Race.*

Oct. 1-3 — *National Airplane Races, St. Louis, Mo.*

Late Fall — *Curtiss Marine Flying Trophy Race.*

FOREIGN

May 13 — *Grand Prix (Balloons), Paris, France.*

June 25-30 — *International Aero Congress, London.*

July 20- *Aug.* 12 — *International Aero Exhibition, Gothenburg, Sweden.*

Aug. 3-31 — *Sailplane Meet, Rhoen, Germany.*

Aug. 5-26 — *Sailplane Meet, Vauville, near Cherbourg, France.*

Sept. 28 — *Schneider Maritime Aviation Trophy Race, Cowes, Isle of Wight, England.*

Dec. 1 — *Entries close for French Engine competition.*

"If war were declared to-morrow what would we do for aircraft?"

U. S. Naval Aviation

Naval Orders—Lt. Comdr. Lewis Hancock, det. Bu. Eng. Navy Dept.; to Nav. Air Sta. Lakehurst, N. J.

Ch. Carp. Francis J. Wilson, det. Inspector of Naval Aircraft, Davis Douglas Co., Santa Monica, Calif.; to U.S.S. Aroostook.

Pay Clk. Oscar W. F. Hicks, det. Nav. Air Station Lakehurst, N. J.; to U.S.S. Orion.

Pay Clk. Walter A. Hill, det. U.S.S. Utah; to Naval Aircraft Factory, Philadelphia.

• • •

Notes from the Capital—Rear Admiral Wm. A. Moffett, Chief of Naval Aeronautics, returned to his Office April 7, after a short trip to Cincinnati, where he spoke on April 3 before the Chamber of Commerce Forum on the development of rigid airships in America, and their commercial possibilities. He also visited a new flying field known as Grisard Field, near Cincinnati, and located the site of a mooring mast for large airships, which it is proposed to have built there. The ZR1 may stop there on her maiden flight from Lakehurst, N. J., in July the Admiral said.

Early in the week, the Admiral went to Philadelphia, where he inspected the Naval Aircraft Factory and the site of the new flying field nearby. This field is being reclaimed from muddy flats, by pumping dredged material from the harbor of the Philadelphia Navy Yard on the low lands at a nominal cost to the Government. A field fully 80 acres in size will be available for the Aircraft Factory experimental and trial flights when it is completed, and may also be used by local pilots.

Lieut. T. T. Patterson, U.S.N., in charge of information in the Office of the Chief of Naval Aeronautics, returned to Washington recently after completing the Naval Observer's Course in flying training at Pensacola.

• • •

Fleet Aviation at Panama—One of the striking examples of the high state of efficiency of the fleet was the performance of the squadrons of scouting planes which accompanied the fleet to Panama and took part in the tactical exercises.

The eighteen scouting planes arrived in Panama after a 2400 mile journey by air from Hampton Roads, and, with scarcely more than time to make minor adjustments and refuel, were sent out on the scouting line on a problem involving fifteen thousand plane miles of flying.

When the scouting squadrons have returned to their base at Hampton Roads they will have completed in the neighborhood of 130,000 plane miles of flying during the southern cruise. This is aside from the Torpedo Squadron which proceeded to Key West from Hampton Roads and was based there for exercises during the winter.

The presence of the aircraft carrier Langley at Panama was inspiring and informative to many who had not been in close touch with the development work that has been going on in connection with the planes for the new aircraft carriers. Practical demonstrations of flying off and landing on the deck of the Langley were given off Panama and many enthusiastic words of praise were expressed for the work that has been accomplished.

• • •

Landing in the Lincoln Memorial Pool—A demonstration of quick Messenger service from the Naval Building to the Naval Air Station at Anacostia was staged by Lieut. David Rittenhouse last week, when he flew from the station and landed in the Lincoln Memorial mirror pools back of the Navy Building and again took off. This was the first time a landing in the flooded pools has been made, although Lawrence Sperry landed in the dry pool last summer in his Messenger and again took off.

Lieutenant Rittenhouse accomplished the feat in a Huff-Daland seaplane, the landing and take off being executed in seven minutes time. Lt. S. H. Quarrels, of Admiral Moffett's Office, climbed into the plane as she landed and made the trip to Anacostia with dispatches.

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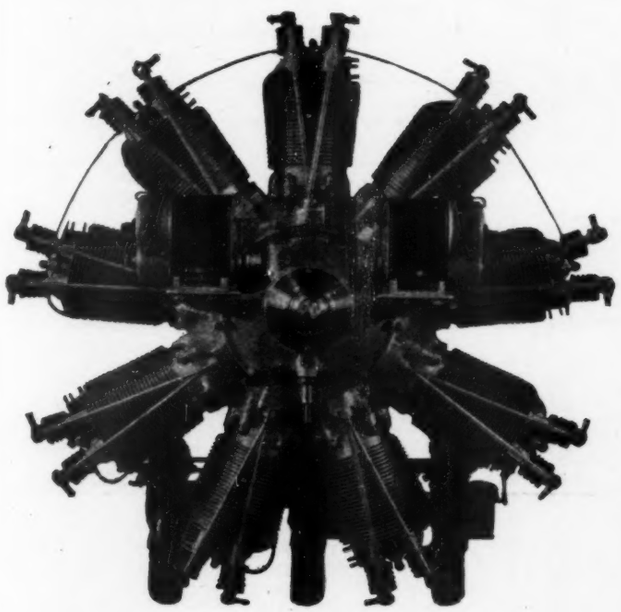

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La Technique Aeronautique, (French), 1921, 3 issues; 1922, 11 issues.
Aviacion, (Argentine), 1921, 2 issues.
Commercial Aviation, (English), 1919, 8 issues.
Flying, (English), 1919, 18 issues.
Aeroplane, (English), 1916, 20 issues; 1917, 45 issues; 1918, 47 issues; 1919, 51 issues; 1920, 43 issues; 1921, 52 issues.
Flight, (English), 1917, 41 issues; 1918, 42 issues; 1919, 23 issues; 1920, 47 issues; 1921, 39 issues; 1922, 49 issues.
Aeronautical Jl., (English), 1915, 3 issues; 1916, 5 issues.
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Aeronautics, (English), 1917, 48 issues; 1918, 44 issues; 1919, 26 issues; 1920, 35 issues; 1921, 9 issues.
Aeroplane & Auto Age, (Canada), 1920, 4 issues.
Flugsport, (German), 1920, 7 issues; 1921, 26 issues; 1922, 20 issues.
Nachrichten fur Luftfahrer, (German), 1922, 37 issues.
Flugtechnik und Motorluftschiffahrt, (German), 1922, 11 issues.
Flug-Woche, (German), 1921, 26 issues.
Der Luftweg, (German), 1922, 3 issues; 1923, 1 issue.
Luftfahrt, (German), 1922, 4 issues; 1923, 1 issue.
S.A.E. Journal, 1921, 1 issue.
Flying, 1915, 12 issues; 1916, 12 issues; 1917, 3 issues; 1919, 10 issues; 1920, 10 issues; 1921, 6 issues.
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